BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

AK

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,563	12/19/2001	Yen-Chieh Huang	01-12-1832	8347

23388 7590 09/03/2003

TROJAN LAW OFFICES
9250 WILSHIRE BLVD
SUITE 325
BEVERLY HILLS, CA 90212

EXAMINER
TRA, TUYEN Q

ART UNIT	PAPER NUMBER
2873	

DATE MAILED: 09/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/025,563	HUANG, YEN-CHIEH	
	Examiner	Art Unit	
	Tuyen Q Tra	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 June 2003* .

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 9-14* is/are rejected.

7)☒ Claim(s) *7 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims **1-6** and **9-14** are rejected under 35 U.S.C. 102(e) as being anticipated by Wooten (U.S. 6,493,473 B1).

a) With respect to claim 1, Wooten discloses in Fig. 2F a nonlinear optical crystal having an electrode-coated dispersion section (120A) in quasi-phase-matched (QPM) sections for electrically controlling the relative phase among the mixing waves thereby applying an electric field thereto. Wooten does not explicitly state that *whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously* but it would be inherent from Wooten's structure since it has been held that functional "whereby" statement does not define any structure and accordingly can not server to distinguish. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957).

The functional recitation that "whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously" has not been give patentable

weight because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth in 35 USC § 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presense of the functional language. In re Fuller, 1929 C.D. 172; 338 O.G. 279.

b) With respect to claim 2, Wooten discloses wherein the nonlinear optical crystal is a material capable of being made into quasi-phase-matched (QPM) nonlinear optical element.

c) With respect to claim 3, Wooten discloses wherein nonlinear optical crystal is made of the material GaAs selected from a group consisting of LiNbO3, LiTaO3, KTIOP04, GaAs and RbTiOAsO4 (col.12, line 41).

d) With respect to claim 4, Wooten discloses wherein the electrode-coated dispersion section is sandwiched between two quasi-phase-matched (QPM) sections (see Fig. 2F).

e) With respect to claim 5, Wooten further discloses wherein the electrode-coated dispersion section is coated with conducting electrodes (120B, 120C) on two opposite surfaces thereof (Fig. 2F).

f) With respect to claim 9, it should be noted that although claim 9 is "method claims", the method steps consist of the broad step of "providing", "applying" and therefore these steps would be inherently satisfied by the apparatus of the reference as modified.

g) With respect to claim 10, Wooten discloses in Fig. 2F a nonlinear optical crystal having multiple electrode-coated dispersion sections monolithically integrated in

cascaded quasi-phase-matched (QPM) sections for electrically controlling the relative phase among the mixing waves therein by applying an electric field thereto. Wooten does not explicitly state that *whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously* but it would be inherent from Wooten's structure since it has been held that functional "whereby" statement does not define any structure and accordingly can not server to distinguish. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957).

The functional recitation that "whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously" has not been give patentable weight because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth in 35 USC § 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presense of the functional language. In re Fuller, 1929 C.D. 172; 338 O.G. 279.

h) With respect to claim 12, Wooten further discloses in Fig. 56 wherein the nonlinear optical crystal comprises two electrode-coated dispersion sections interleaved in three quasi-phase-matched (QPM) sections for performing the nonlinear frequency conversion and amplitude modulation simultaneously.

i) With respect to claim 13, Wooten discloses in Fig. 2F a nonlinear optical crystal having at least one electrode-coated dispersion section integrated in cascaded quasi-phase-matched (QPM) sections for electrically controlling the relative phase among the mixing waves there mi by applying an electric field thereto; and

a waveguide (22)formed in the nonlinear optical crystal for guiding the mixing waves through the QPM sections and the dispersion section in the nonlinear optical crystal. Wooten does not explicitly state that *whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously* but it would be inherent from Wooten's structure since it has been held that functional "whereby" statement does not define any structure and accordingly can not server to distinguish. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957).

The functional recitation that "whereby performing the nonlinear frequency conversion and amplitude modulation simultaneously" has not been give patentable weight because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth in 35 USC § 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presense of the functional language. In re Fuller, 1929 C.D. 172; 338 O.G. 279.

k) With respect to claim 14, Wooten discloses in Fig. 2F wherein the waveguide is fabricated on the surface of the nonlinear optical crystal and the conducting electrodes (120B 120C) are coated with conducting materials on the two sides of the waveguide (22), wherein the relative phase of the mixing waves is controlled by the applied electric field on the electrodes, thereby the wavelength converted output is amplitude modulated.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be

patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wooten (U.S. 6,493,473 B1), as applied to claims 1 and 10, in view of Sander (U.S. Patent No. 6,304,585).

Wooten teaches apparatus for transformation of the polarization of light comprising of nonlinear conversion, but fail to discloses wherein each of the quasi-phase-matched (QPM) sections is the crystal section for performing one of the nonlinear optical processes, including *second harmonic generation (SHG),* difference frequency generation (DFG), sum frequency generation (SFG), optical parametric generation (OPG), optical parametric amplification (OPA), and optical parametric oscillation (OPO) (col.2, line 66)

Within the same field of endeavor, Sander et al. disclose a frequency conversion system teach of nonlinear optical include a second harmonic generation.

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct the optical device such as disclosed by Wooten, with second harmonic generation such as discloses by Sander et al., for purpose of generating conversion frequency.

Allowable Subject Matter

5. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reason for the indication of allowable subject matter is that (claim 7) the electrode-coated dispersion section is sandwiched between quasi-phase-matched nonlinear gratings, the nonlinear gratings have both the grating vectors (35b) parallel to the wave vector of the mixing waves, and the amplitude modulation is dynamically adjusted to the desirable modulation regime with a direct-current voltage offset on the electrodes; (claim 8) the electrode-coated dispersion section is sandwiched between quasi-phase-matched nonlinear gratings, one of the nonlinear gratings has the grating vector parallel to the wave vector of the mixing waves, the other the nonlinear grating has the grating vector (1478, 1480) forming an angle (90°) with respect to the wave vector of the mixing waves, and the amplitude modulation is dynamically adjusted to the desirable modulation regime by laterally translating the nonlinear crystal with respect to stationary mixing waves disclosed in the claims is not found in the prior art.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyen Tra whose telephone number is (703) 306-5712. The examiner can normally be reached on Monday to Thursday from 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps, can be reached on (703) 308-4883. The fax number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

tt

August 14, 2003

Hung Xuan Dang
Primary Examiner